International Civil Aviation Organization

The Fifth Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/5)

Bangkok, Thailand, 13 – 16 January 2026

Agenda Item 4: Implementation of CNS-ATM Systems

INDIA'S PREPAREDNESS FOR MITIGATION OF GNSS RFI

(Presented by Airports Authority of India, India)

SUMMARY

This paper presents the action initiated in India to handle the issues arising out of GNSS Radio Frequency Interference (GNSS RFI) which is emerging as a global threat to Civil Aviation.

1. INTRODUCTION

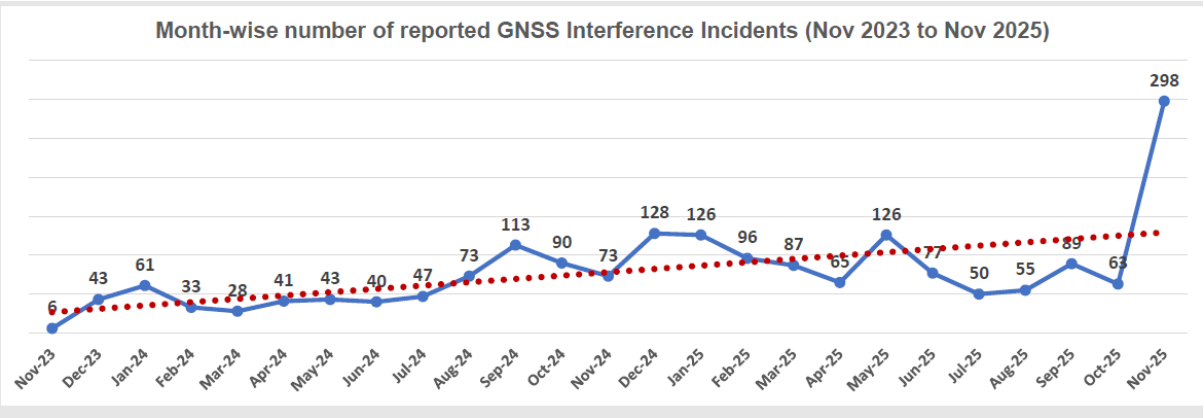
1.1 GNSS Radio Frequency Interference has emerged as an issue for Civil Aviation throughout the world. Growing dependence on GNSS navigation and avionics are severely affected by GNSS jamming and spoofing. India has taken some concertative effort to handle these issues.

2. DISCUSSION

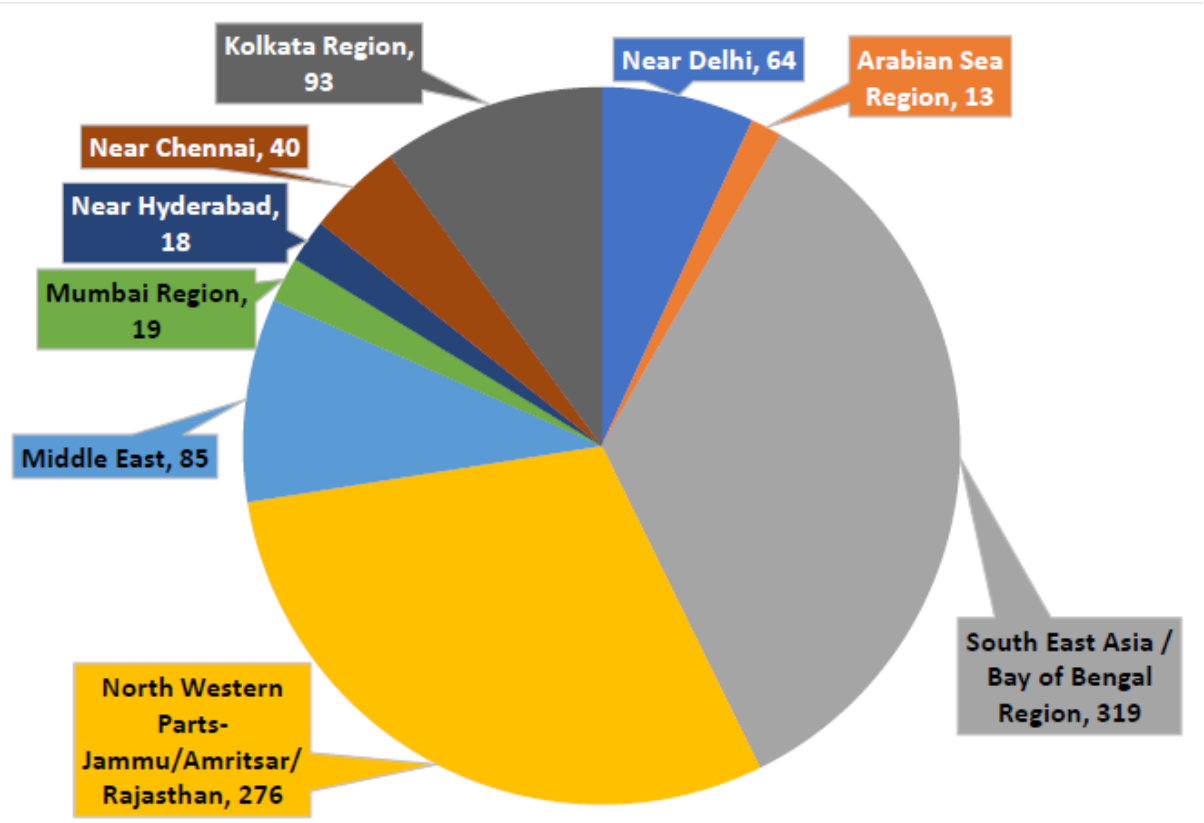
GNSS RFI

2.1 GNSS RFI is basically electromagnetic interference of the weak signals of Global Navigational Satellite System (GPS, GLONASS, Galileo, Beidou). These interferences may be unintentional or intentional. Unintentional RFI may arise out of various electromagnetic sources such as high power lines, solar flares etc. Intentional GNSS RFI are manmade and categorized as Jamming and spoofing. While jamming of GNSS signals cause GNSS signals not available to receiver, spoofing feeds the receiver with maliciously spurious signal causing aircraft to rely on wrong navigational data making it a safety concern.

2.2 GNSS RFI has increased many fold in recent years and prevalent in many parts of the world, especially in and near conflict zones. However, there are reports of GNSS RFI in other places also. A total of 1951 GNSS RFI reports has been received in India between Nov-2023 to Nov-2025 showing an overall increasing trend. It is therefore necessary for States to take proactive measures to deal with this menace.



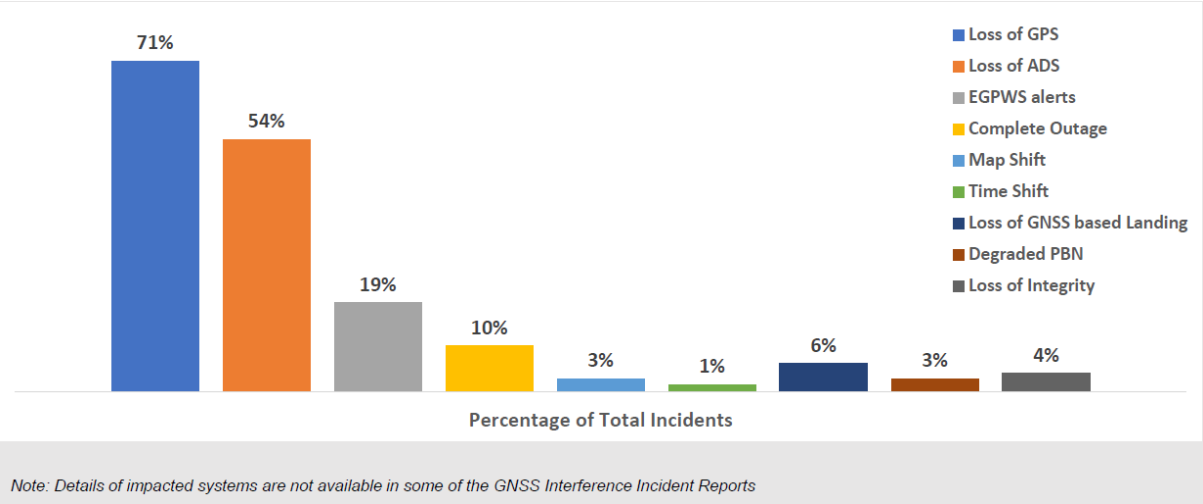
Area/Region-wise distribution of Reported Incidents-2025



Note: The number of region-wise incident have been derived based on location data including sector, phase of flight, affected area as location coordinated were not available in most of the reports

2.3 GNSS RFI can affect various avionics and interfere with the navigation of the aircraft. Spoofing of GNSS can cause aircraft to deviate unintentionally from its track, cripple navigation capability of the aircraft, cause spurious EGPWS warning, loss of RNP, unserviceable weather radar amongst other things.

System Impact distribution of Reported Incidents-2025



Note: Details of impacted systems are not available in some of the GNSS Interference Incident Reports

EFFORTS IN INDIA TO MITIGATE GNSS RFI

2.4 The Director General of Civil Aviation took note of the rising GNSS RFI, especially the GNSS spoofing reports in 2023 in and around the conflict zones. They Conducted a comprehensive situation assessment, studies, discussions with OEMs, ANSP, airlines and other CAAs. Recognizing need for guidance in case of GNSS RFI, DGCA published Advisory Circular on GNSS Interference **DGCA ANSS AC01 of 2023–GNSS Interference in Airspace** on 24th November 2023.

2.5 This advisory circular provides comprehensive guidelines for airlines operators, Pilots, Air Traffic Controllers and Air Navigation Service Providers for dealing with the threat in effective and coordinated manner.

The circular mandates Reporting of GNSS RFI events and provides a reporting format as per ICAO Doc 9849, GNSS Manual and experienced gained.

It also provides guidance for safety risk assessments and mandates development of SOP and Contingency procedures for stakeholders.

2.6 In line with the advisory circular of the DGCA, AAI has developed a Contingency Procedure for Air Traffic Controllers in July 2025 to help them deal with GNSS RFI events. This contingency procedure defines GNSS Jamming and Spoofing. It also provides awareness on the avionics that may be affected by GNSS RFI and possible consequences. It outlines the action to be taken by Air Traffic Controllers in various scenarios of GNSS RFI.

2.7 AAI has also conducted a Safety Risk Assessment of GNSS RFI events based on the collected reports, knowledge and experiences in December 2025 in presence of ATM, CNS, Regulator, Airlines, IATA, Pilots, Industry Partners, Military, Space Research Agencies and other agencies.

2.8 India also hosted the ICAO APAC Radio Navigation Symposium in April 2025 in which one of the prevalent topic was GNSS RFI. AAI also hosted internal seminars on GNSS RFI to spread awareness and knowledge sharing amongst stakeholders. The Topic has been made a part of annual refresher training for ATCOs and Pilots as per the advisory circular of DGCA.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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